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Differentmodesoftreatmentandcomplicationsassociatedwithnon-traumatic gastrointestinal perforation

ABSTRACT

Background: Gastrointestinal (GI) Perforation is an important emergency situation that usually requires prompt surgery. Prompt detection of Gastrointestinal (GI) tract perforation is important for the diagnosis of life-threatening conditions inpatients withacuteabdomen. AnumberofcausescanleadtoGastrointestinaltractperforations(bluntor penetrating trauma, peptic ulcer, inflammatory disease, foreign body, a neoplasm or iatrogenic factors); and has variable clinical presentations, particularly in the early clinical course. Present study aimed at investigating the different modes of treatment and complications associated with non-traumatic gastrointestinal perforation.

Methods: This cross-sectional observational study was carried out on patients of Department of general surgery at Late Lakhiram Agrawal Memorial Government Medical college (LAMGMC) Raigarh, Chhattisgarh, India from September 2014 to August 2016. A total 100 adult subjects (both male and females) of all age groups were includedin this study.

Results: Operative management (44%), conservative management 38% and 18% of cases were managed with Peritoneal drainage under local anaesthesia (LA). Most common complications of peptic perforation cases were toxaemia (32.3%), wound gaping (17.9%) and respiratory complications (11%). Most common complications of typhoid perforation cases were toxaemia (50%), respiratory complications (32.4%), wound infection (22.2%) and wound gaping (18.5%). Most common complications of Appendicular perforation cases were wound gaping (50%) and toxaemia (40%). The average duration of stay in hospital was 16.52 days.The average duration of stay in hospital of Peptic perforation was 17.3 days, typhoid perforation 18.3 days, Appendicular perforation 18.5 days and for other perforation was 12 days.

Conclusions: Majority of the cases undergone for operative management

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and most frequently developed complications were toxaemia followed by wound gaping and respiratory complications. The average duration of stay in hospital was nearly same for all cases and the stay was less in patients who were managed conservatively.

Keywords: Appendicular perforation, Non-traumatic gastrointestinal perforation, Peptic perforation, Typhoid perforation

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INTRODUCTION

Gastrointestinal (GI) Perforation is an important emergencysituationthat usuallyrequiresprompt surgery. PromptdetectionofGastrointestinal(GI)tractperforation is important for the diagnosis of life-threatening conditions in patients with acute abdomen.[1,2] A numberof causes can lead to Gastrointestinal tract perforations (blunt or penetrating trauma, peptic ulcer, inflammatory disease,foreignbody,aneoplasmoriatrogenicfactors);

and has variable clinical presentations, particularly in the early clinical course.[3]

A peptic ulcer is the most common cause of upper gastrointestinal perforation and responsible for about50% of all cases. Mortality rates up to 30% and mortality increases with increasing age and is significantly higherin patients who have another medical co-morbidity.[2,4] Typhoid fever is a severe febrile illness caused primarily by the gram-negative bacillus Salmonella typhi.[5] Although intestinal haemorrhage is the most common complicationoftyphoidfever,intestinalperforationisthe complication associated with highest morbidity and mortality[5].

Mortalityrates ofintestinal perforation following typhoid fever are 5% to 62%.[6]The acute appendicitis is the most common surgical disease.[7] Acute appendicitis is a common cause of abdominal pain in all ages since it occursin7%ofthepopulationandhasa nincidenceof 1.1casesper1.000personseachyear.[8] Theobstructionof the lumen of the appendix is the main causative factor in the perforation of the appendix. The mortality and morbidity are increased in cases of perforatedappendix.[7,9]

Complications of gastric perforation include toxaemia, respiratory distress, wound infection, wound gaping, gastrocutaneous fistula, bed sore and burst abdomen.[10]

Diagnosis largely depends on imaging examinations, and the correct diagnosis of the presence, level, and cause of perforation is imperative for appropriate patient management and surgical planning. The mainstay of treatment for bowel perforation is surgery.[10] Endoscopic, laparoscopic and laparoscopic-assisted procedures are now being increasingly performed instead ofconventional laparotomy. Moreover, if any signs and symptoms of generalized peritonitis are absent and the perforation site has sealed spontaneously, then a perforated duodenal ulcer can be treated with non- surgical procedures.[11]

Unfortunately, the delay in diagnosis and management lead to a poor outcome and increase compilations and mortality. Gastrointestinal tract perforations are common in this part of the country while very few studies have been done on this subject. With this background, this study was conducted to study the clinicopathology of gastrointestinal tract perforations with the primary

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objective ofthe study was to studythe different modes of treatmentand complications associated with non- traumatic gastrointestinal perforation among patients admittedatourinstitution,overa2-yearperiod.ourstudy isasmallstep toward the futureto fulfilthelacunainthis area.

METHODS

This cross-sectional observational study was carried out onpatientsofDepartmentofgeneralsurgeryatLate Lakhiram Agrawal Memorial Government Medical college (LAMGMC) Raigarh, Chhattisgarh which caters to a large volume ofreferred cases fromthe north-eastern part of Chhattisgarh state in India from September 2014toAugust2016.Atotal100adults ubjects(bothmaleand females) of all age groups were included in this study.

Patient admitted to ward diagnosed with non-traumatic Gastrointestinal (GI) tract perforation of Either sex who gave informed consent were included in the study. Patients with traumatic Gastrointestinal (GI) tract perforation, other pre-existing sever general medical condition and who refuses to give informed consent were excluded from the study.

Procedure

After obtaining written informed consent, a detailed history was obtained from patient and relatives, a well- designed questionnaire was used to collect the data of the recruited patients. The questionnaire included socio-demographic characteristics such as age, gender, residency, occupation, symptoms such as pain inabdomen its site nature and radiation, vomiting its frequency and nature; distension of abdomen; constipation; fever its grade and type.

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A thorough general examination was carried out in each case, with special attention to pulse, respiration temperature, blood pressure, the degree of dehydration and pallor. A careful and detailed examination of the abdomen was carried out with special reference to distension of abdomen, tenderness, guarding, abdominal girth, the presence of free fluid in the peritoneal cavity; obliteration of liver dullness, rebound tenderness and bowel sounds. Per rectal examinations was done to find out any evidence of pelvic abscess e.g. bulging ofanterior rectal wall, bogginess or tenderness. P/V examinationinrelevantfemalepatient swascarriedoutto detect the collection of fluid in the pouch of Douglas.

On the basis of history, clinical examination and with the help of different investigations a provisional diagnosis arrived. The cases studied in the present study were divided into peptic perforation, typhoid perforation, appendicular perforation and other group.

Every patient was resuscitated, IV fluids, antibiotics and nasogastric suction were started. Conservative treatment was instituted in a case coming late with the poor general condition, in resolving cases and in patients who refused for operation.

The patients who were fit for general anaesthesia were submitted to an operation.

Peritoneal drainage under local anaesthesia was done in patientswhohadlowgeneralcondition totolerategeneral anaesthesia and were either dyspnoeic due to a huge collection of fluid in the peritoneal cavity or were toxic and in patients showing features of localisation of intraperitoneal pus.

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Statisticalanalysis

Different modes of treatment and complications of gastrointestinal perforation Findings were analyzed using descriptive analysis technique and recorded as total number (n) and percentage (n%).

RESULTS

Total 3591 cases admitted in Surgical wards, 832 cases admitted with acute Abdomen out of which 100 cases were of non- traumatic GIT perforation (12.01% of acute abdomen, 2.78% of total admission).

Table1:Modesof treatment.

Modeof treatment	Peptic		Typhoid		Appendicular		Others		Total	
	N	n%	n	n%	n	n%	n	n%	n	n%
Operative	21	35.6	17	50	4	80	2	100	44	44
Conservative	30	50.9	7	20.6	1	20	0	0	38	38
Peritonealdrainageu nderL.A.	8	13.6	10	29.4	0	0	0	0	18	18

Present study findings reveal that in most of the cases operative management was done (44%), conservative managementwasusedin38%ofcasesa ndonly18%of cases were managed with Peritoneal drainage under LA. Conservative management was most commonly used in cases of peptic perforation (50.9%) (Table 1).

Table2:Complicationsinpepticperforationcases.

Complications	Operative (20cases)		Peritonealdrainage (8 cases)		Conservative (31 cases)		Total (59cases)	
	n	n%	N	n%	N	n%	n	n%
Toxaemia	3	15	7	87.5	9	29.0	19	32.2
Respiratorycomplications	4	20	1	12.5	2	6.5	7	11.9
Woundinfection	2	10	0	0	0	0	2	7.1

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Woundgaping	4	20	1	12.5	0	0	5	17.9
Gastrocutaneous fistula	2	10	0	0	0	0	2	7.1
Bedsore	1	5	0	0	0	0	1	3.6
Burstabdomen	0	0	0	0	0	0	0	0

The most common complications of peptic perforation were Toxaemia (32.3%), Wound gaping (17.9%) and Respiratory complications (11%). In operative cases,20% have respiratory complications and wound gaping and 15% have toxaemia (Table 2).

Most common complications of typhoid perforation were Toxaemia (50%), respiratory complications (32.4%), wound infection (22.2%) and wound gaping (18.5%). In peritoneal drainage, 60% have respiratory complications and 50% have toxaemia (Table 3).

Table3:Complicationsintyphoidperforationcases.

Complications	Operative (17cases)		Peritonealdrainage (10 cases)		Conservative (17 cases)		Total (44cases)	
	n	n%	n	n%	n	n%	n	n%
Toxaemia	7	41.2	5	50	5	71.42	17	50
Respiratorycomplications	4	23.5	6	60	1	14.28	11	32.4
Woundinfection	4	23.5	2	20	0	0	6	22.2
Woundgaping	4	23.5	1	10	0	0	5	18.5
Bedsore	1	5.8	0	0	0	0	1	3.7
Faecalfistula	1	5.8	3	30	0	0	4	14.8
Burstabdomen	1	5.8	0	0	0	0	1	3.7

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Themostcommoncomplicationsofappendicularperforationwerewoundgaping(50%)andtoxaemia (40%).Inoperativemanagement,50% haverespiratory complications and 25% have toxaemia (Table 4).

Table4:Complicationsinappendicularperforationcases.

Complications	Operative (4 cases)		Peritonealdrainage (0 case)		Conservative (1 case)		Total (5cases)	
	n	n%	N	n%	n	n%	n	n%
Toxaemia	1	25	0	0	1	100	2	40
Woundgaping	2	50	0	0	0	0	2	50
Respiratorycomplications	0	0	0	0	0	0	0	0
Woundinfection	0	0	0	0	0	0	0	0
Burstabdomen	0	0	0	0	0	0	0	0
Faecalfistula	0	0	0	0	0	0	0	0

Table5:Stayinhospitalinoperatedcases.

Durationofstayin days	Peptic		Typhoid		Appendicular		Others		Total	
	n	n%	n	n%	n	n%	n	n%	n	n%
0-10	3	14.3	0	0	0	0	1	50	4	11.4
11-20	10	47.6	10	66.7	3	75	1	50	21	60
21-30	4	19.0	3	20	1	25	0	0	7	20
≥30	1	4.8	2	13.3	0	0	0	0	3	8.6
Averagestayin days	17.3		18.3		18.5		12		16.52	

The average duration of stay in hospital for operatedcases was 16.52 days.Average duration stay in hospital ofPepticperforationwas17.3days,typhoidperforation 18.3 days, Appendicular perforation 18.5 days and for other perforation was 12 days (Table 5).

The average duration ofstays inhospital for conservative cases was13.8days.Average durationofstayinhospital ofPepticperforationwas8.5days,typhoidperforation14 days and for Appendicular perforation was 19 days(Table 6).

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Table6:Stayinhospitalinconservativecases.

Durationofstayin days	Peptic		Typhoid		Appendicular		Others		Total	
	n	n%	n	n%	n	n%	n	n%	n	n%
0-10	16	76.2	1	25	0	0	0	0	17	65.4
11-20	5	23.8	2	50	1	100	0	0	8	30.8
21-30	0	0	1	25	0	0	0	0	1	3.8
≥30	0	0	0	0	0	0	0	0	0	0
Averagestayin days	8.5		14		19		0		13.8	

Table7:Stayinhospitalinperitonealdrainageunderlocalanaesthesia.

Durationofstayin days	Peptic		Typhoid		Appendicular		Others		Total	
	n	n%	N	n%	n	n%	n	n%	n	n%
0-10	0	0	0	0	0	0	0	0	0	0
11-20	2	66.7	3	60	0	0	0	0	5	62.5
21-30	1	33.3	1	20	0	0	0	0	2	25
≥30	0	0	1	20	0	0	0	0	1	12.5
Averagestayin days	18		23.6		0		0		20.8	

Theaveragedurationofstayinhospital forPeritoneal drainageunderlocalanaesthesiawas20.8 days.Average durationstayinhospitalofPepticperforationwas18 days and typhoid perforation was 23.6 days (Table 7).

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DISCUSSION

Gastrointestinal (GI) Perforation is an important emergency situation that usually requires prompt surgery often delay in diagnosis and treatment leads to severe complication and increase morbidity and mortality. Our study reveals that majority of the cases undergone for operative management, followed by conservative management was used and least no of the cases were managed with Peritoneal drainage under LA. Conservative management was most commonly used in cases of peptic perforation.[12,1]

In our study, we found that the most common complications were toxaemia followed by wound gaping and Respiratory complications. In operative cases of peptic perforation respiratory distress, wound gaping and toxaemia were the major complications. Common complications of typhoid perforation include toxaemia, respiratory complications, wound infection and wound gaping. Most common complication of Peritoneal drainage for typhoid perforation were respiratory complications and toxaemia. Most commoncomplications of Appendicular perforation were wound gaping and Toxaemia.[14,15] The patient who managed operatively mostly has respiratory complications and toxaemia. Our results were in line with the findings of other studies who found types of complications. Singh studied on 80 cases of gastrointestinal perforation and he found that wound infection (53%), chest infection (23%), abscess (pelvic + subphrenic) (14%) and duodenalfistulae(11%)weremostco mmoncomplications.[16]Study conducted on 182 cases of peptic ulcer perforations (150 duodenal, 32 gastric) by Fong found that the intra- abdominal abscess(22 cases), wound infection(26 cases) and generalized bacterial peritonitis (18 cases) were most common complications. [12,13,17]

Our study reveals that the average duration of stay in hospital was nearly same for all cases of gastrointestinal perforation (16.52-18.5 days) so we can conclude thatstay in hospital was independent of the cause of gastrointestinal perforation. Average duration stay in hospital was less in patients who were managed conservatively it may be due to their general condition were good and having fewer complications.

CONCLUSION

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Gastrointestinal (GI) Perforation is an important emergency situation that usually requires prompt surgery often delay in diagnosis and treatment leads to severe complication and increase morbidity and mortality. Majority of the cases undergone for operative management and most commonly developed complications were toxaemia followed by wound gaping and Respiratory complications. The average duration of stayin hospital was nearlysame for all cases and the stay was less in patients who were managed conservatively. Despiteourbesteffort,therearelimitationsofourstudy, which includes small sample size, lack of a control group and a lack of other parameters (other medical conditions, theeffectofthedrug,durationofthe untreatedcondition) of GI Perforation. These limitations can be overcome in the future studies.

Ethicalapproval:Thestudywasapprovedbythe Institutional Ethics Committee

REFERENCES

1. Devi PS, Manikantan G, Chisthi MM. Gastrointestinal perforations: a tertiary care centre experience. Int Surg J. 2017;4(2):709-13.
2. Van Leerdam ME. (2008). Epidemiology of acute upper gastrointestinal bleeding. Best Pract Res Clin Gastroenterol. 2008;22(2):209-24.
3. Coppolino FF, Gatta G, Di Grezia G, Reginelli A, Iacobellis F, Vallone G, Giganti M, Genovese EA. Gastrointestinal perforation: ultrasonographic diagnosis. Crit Ultrasound J. 2013 Dec;5(S1):S4.
4. Søreide K, Thorsen K, Harrison EM, Bingener J, Møller MH, Ohene-Yeboah M, Søreide JA. Perforated peptic ulcer. Lancet. 2015 Sep;386(10000):1288-98.
5. Hosoglu S, Aldemir M, Akalin S, Geyik MF, Tacyildiz IH, Loeb M. Risk factors for enteric

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perforation in patients with typhoid fever. Am J Epidemiol. 2004 Jul 1;160(1):46-50.
6. Jain S, Meena LM, Ram P. Surgical management and prognosis of perforation secondary to typhoid fever. Trop Gastroenterol. 2017 Jun;37(2):123-8.
7. Furukawa A, Sakoda M, Yamasaki M, Kono N, Tanaka T, Nitta N, Kanasaki S, Imoto K, Takahashi M, Murata K, Sakamoto T. Gastrointestinal tract perforation: CT diagnosis of presence, site, and cause. AbdomImaging. 2005 Oct 1;30(5):524-34.
8. Alvarado A. How to improve the clinical diagnosis of acute appendicitis in resource limited settings. World J Emerg Surg. 2016 Dec;11(1):16.
9. Voermans RP, Le Moine O, Von Renteln D, Ponchon T, Giovannini M, Bruno M, Weusten B, Seewald S, Costamagna G, Deprez P, Fockens P. Efficacyof endoscopic closure of acute perforations of the gastrointestinal tract. Clin Gastroenterol Hepatol. 2012 Jun;10(6):603-8.
10. Khattak S, Aslam S, Kamal A. Acute appendicitis: an audit of 663 cases. Gomal J Med Sci. 2010 Dec 31;8(2):209-11.
11. Anandaravi BN, Ramaswami B. Appendicular perforation and its contributing factors. Int Surg J. 2017 May 24;4(6):2007-9.
12. Marsicovetere P, Ivatury SJ, White B, Holubar SD. Intestinal Intussusception: Etiology, Diagnosis, and Treatment. Clin Colon Rectal Surg. 2017 Feb;30(1):30-9.
13. Kordzadeh A, Melchionda V, Rhodes KM, Fletcher EO,PanayiotopolousYP.Bluntab dominaltrauma

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and mesenteric avulsion: a systematic review. Eur J Trauma Emerg Surg. 2016 Jun 1;42(3):311-5.

14. Kassir R, Boueil-Bourlier A, Baccot S, Abboud K, Dubois J, Petcu CA et al. Jejuno–ileal diverticulitis: Etiopathogenicity, diagnosis and management. Int J Surg Case Reports. 2015 Jan 1;10:151-3.
15. ReukenPA, KruisW, MaaserC,TeichN,BüningJ, Preiß JC, German IBD Study group [GISG]. Microbial spectrum of intra-abdominal abscesses in perforating Crohn's disease: Results from a prospective German Registry. J Crohn's Colitis. 2018 Feb;12(6):695-701.
16. Singh AK. Complications of peptic ulcer perforation: a clinical case study. Asian J Biomed Pharmaceut Sci. 2016;6(57):48.
17. Fong IW. Septic complications of perforated peptic ulcer. Canadian J Surg. 1983 Jul;26(4):370-2.

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